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5. The *Bovine Antelopes* have the muffle moderate, with a small naked moist muzzle under the nostrils.

BOSELAPHUS. Horns lyrate, thick at the base on the produced upper edge of the frontal bone. Tear-bag covered with a tuft of hair. *B. Bubalis* and *B. Caama*.

DAMALIS. Horns lyrate, tapering. Tear-bag naked. * *D. lunatus*, ** *D. senegalensis*, *D. Koba*, *D. pygarga*, *D. albifrons*, and *D. ? Zebra*.

All these species, except *Gazella Dama* and *G. mohr*, *Scophophorus montanus*, *Capricornis sumatrensis* and *C. crista*, *Mazama americana*, *Oryx Biessa* and *Damalis albifrons*, are in the British Museum collection.

XXVI.—*An Account of some Shells and other Invertebrate Forms found on the coast of Northumberland and of Durham.* By WILLIAM KING, Curator of the Newcastle Museum*.

MOST of the objects treated of in this paper have been obtained at different times from the cobbles and the decked boats which frequent the fishing-grounds between the Dogger-bank and the coast stretching from the Tweed to the Tees; the remainder were got during a dredging excursion in a decked fishing-boat on some of the same grounds in the latter part of last June.

Though I was at sea from Monday till Friday, yet in consequence of the extremely unfavourable state of the weather for the greater part of the time, the dredge was not put down more than five times; it will therefore be readily presumed that my dredging operations were not so successful as could be wished.

At every haul of the dredge I was particular in noting the different kinds of objects brought up, the depth of water, and the nature of the sea-bottom.

The dredge was first put down (on Tuesday morning) in fifty fathoms water, not far from the edge of the Dogger-bank, and at about sixty miles east of Sunderland: here it brought up a large number of dead shells in a chalky state, and a few living objects: the former consisted of *Pecten opercularis* and *Mactra elliptica* in abundance, several specimens of *Mya truncata* †, two

* Read at the Sixteenth Meeting of the British Association for the Advancement of Science.

† The specimens of *Mya truncata* closely resemble the elongated form found close in shore: finding it at so great a depth demands something more than a passing notice, since I am not aware that this variety has ever been found alive elsewhere than in shallow water. Were it certain that the elongated form did not live in deep water, we might then safely conclude that the sea-bottom which was dredged had subsided since the *Myas*, found on it, were living. Since writing the above I find it stated by Professor E.

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or three of the common *Cyprina* (all of which were odd valves), and a single *Scalaria Trevelyaniana*: the living objects were one each of *Trochus tumidus*, *Natica grænelandica*, *Rimula Noachina* and *Mysia undata*, a few specimens of *Chiton cinereus*, two or three of *Pecten opercularis*, half a dozen of *Dentalium entalis*, a *Psolus squamatus* (adhering to the inside of a valve of *Cyprina islandica*), a few young specimens of *Psolus phantapus*, one of *Halichondria mammillaris* (growing on a stone), and a new species of Crustacea of the genus *Æga*. Although very rare, I had previously got from the boats *Natica grænelandica*, *Halichondria mammillaris* and *Psolus squamatus*; the last, as far as I have been able to ascertain, has not been procured on the east coast of Britain before.

In consequence of the sea being very rough, it was decided not to put the dredge down again until the weather turned more favourable, but in this we were disappointed, as a heavy gale came on which compelled us to run in for the Scotch coast, which together with the Cheviots we saw the next morning,—the sea all the time heaving dreadfully. In the evening (Wednesday), the gale having suddenly abated, we thrice succeeded in putting down the dredge in thirty fathoms, and at about as many miles from the south part of the coast of Northumberland. The principal objects brought up were Echinoderms, as *Ophiura texturata*, *Luidia fragilissima*, *Spatangus purpureus*, *Amphidotus cordatus*, along with which were several fine specimens of *Nymphon giganteum*, a few corals and corallines, as *Farcimia salicornia*, *Cellepora Skenei*, *C. ramulosa*, *Eudendrium rameum*, *Tubularia gracilis*, *Thuiaria thuaia*, &c., a single living specimen of *Pecten striatus*, Müller, two or three of *P. opercularis*, and several fragments of *Sabella lumbricalis* (?). As *Nymphon giganteum* is a rare species*, and the *Pecten striatus* a remarkably fine specimen, and specifically new to our coasts, it may readily be imagined that I was quite content with our evening's operations. The Echinoderms were beau-

Forbes that *Mya truncata* "inhabits the littoral, laminarian and coralline zones on the coast of Great Britain," that is, ranging from between tide-marks to fifty fathoms (vide Memoirs of the Geological Survey, vol. i. pp. 375 and 408). Were all the specimens obtained from these zones in a living state? and were they all of the elongated form? From what I have seen of the variation of *Mya truncata* on our coasts (vide remarks on the variety *M. pelagica*), I am led to suspect that the living specimens from the coralline zone are much shorter than those from shallow water. It is stated by Mr. Lyell that he has intermediate varieties between the normal form of *Mya truncata* and *M. Uddevallensis* (vide Geological Transactions, 2nd ser. vol. vi. p. 137); it would be arriving at an important point in the history of these species if the depth of habitat of the several varieties here alluded to were known.

* First described by Mr. H. D. Goodsir in the Reports of the Berwickshire Naturalists' Club, vol. ii. p. 114. [See also this Journal vol. xv. p. 293.]

tiful specimens; but I much regret to state that the *Luidias* were equally as great adepts in the art of dismembering themselves as those whose suicidal powers are so graphically described by Professor Forbes in his 'History of British Starfishes*.' From the number of fragments that came up of *Sabella lumbricalis* (?), the sea-bottom at this place must have been covered with it. The anchor brought up a quantity of clay resembling a red argillaceous deposit at Seaton, near the mouth of the Tees, and belonging to the new red sandstone series: it would be important to know if the former were really of the same geological age as the latter.

The next day (Thursday) we only succeeded once in throwing out the dredge, which came up filled with nothing but sand. After this unsuccessful haul, which no doubt reminded our boat's crew of their very unsuccessful fishing, we steered in for the land, which we reached on Friday morning.

A few more facts connected with the subject-matter of this paper remain to be noticed. During the early part of the present year, I procured from the boats specimens of four kinds of shells which there is every reason to believe are not living on our coasts at the present day; these are *Astarte elliptica*, *A. compressa* var. *laticor*, *Saxicava sulcata* and *Mya uddevallensis*.

The specimens of *Astarte elliptica*, Brown, generally resemble those so abundant in Loch Gair, but some of them are larger than any I have seen from that locality—the largest specimen being $1\frac{3}{8}$ ths by 1 inch. A few of them resemble the specimen figured by Capt. Brown under fig. 3. pl. 38. of his 'Conchology of Great Britain,' 2nd ed. I am not aware that it has ever been found alive in the German Ocean south of Aberdeenshire, where it has been got by Professor Macgillivray; it occurs in a fossil state at Bridlington, in the basin of the Clyde, at Uddevalla, and on the banks of the Dwina 240 versts above Archangel: from the last-named locality, M. Verneuil has favoured me with specimens closely resembling the variety above-quoted.

My specimens of *Astarte compressa*, variety *laticor*, closely resemble the same variety found fossil at Bridlington. It differs in no respect from the form at present living on our coasts except in being much larger—the former being nearly an inch in diameter (at Bridlington), while my largest specimen of the latter does not exceed half an inch. There is still considerable obscurity hanging over the variety *laticor*: I am led to believe that it occurs at Uddevalla; and probably the so-called *Astarte multicostata* of Smith found in the Clyde beds is the same shell. I am not aware that it has been found anywhere in a living state.

* Pp. 138 and 139.

I have only got one specimen of the so-called *Saxicava sulcata* of Smith, which is generally considered a large form of *Saxicava rugosa*. My specimen is the size of that figured by Mr. Lyell in the 'Philosophical Transactions' for 1835, pl. 2. fig. 24. Mr. Lyell states that Capt. Bayfield has found it alive in the Gulf of St. Lawrence, and I believe it occurs in all the fossiliferous localities already mentioned.

My specimens of *Mya uddevallensis** are identical in every particular with those figured by Mr. Lyell in his paper "On the Fossil and Recent Shells collected by Capt. Bayfield in Canada †." It differs from *Mya truncata* in being shorter, "and the posterior truncation oblique and inclined to the basal margin, and with a smaller sinus in the muscular (pallial) impression ‡." It occurs in a fossil state at Uddevalla, in Canada, in Northern Russia, and in the basin of the Clyde; and it is still living in the Gulf of St. Lawrence §.

All my specimens of the foregoing shells have very much the appearance of the Norwich crag and Uddevalla fossils—a circumstance which, viewed in connexion with what has just been stated, and the fact that none have yet been found living in the locality where they occur, is strongly in favour of the conclusion that they are pleistocene fossils. As far as I can learn, they were brought up from a shell-bank situated about twenty-five miles to the east of the Fern Islands. If my inference respecting the age of these fossils be correct, it is necessarily proved, that the place where they occur was covered with the sea during the pleistocene period.

HALICHONDRIA MAMMILLARIS = *Spongia mammillaris*, Müller.

This sponge does not appear to be common on our coasts. Of two specimens which I have procured, one was brought up by the lines from deep water ||, and the other I dredged in fifty fathoms. The base of either does not exceed an inch in diameter; the mammillations are three-quarters of an inch in length.

HALICHONDRIA, nov. spec. ?

As the sponge under consideration has some characters in common with *Halichondria ficus*, which is "liable to some modifica-

* So called in Prof. E. Forbes' valuable paper "On the Geological Relations of the existing Fauna and Flora of the British Isles." Vide Memoirs of the Geological Survey, &c., vol. i. p. 407.

† Geological Transactions, 2nd ser. vol. vi. pl. 16. figs. 5 and 6.

‡ *Ibid.* p. 137.

§ *Ibid.*

|| By the expression "deep water" must be understood a depth ranging from forty to eighty fathoms. The greatest depth given in Norrie's Chart of

tion from the nature of the object it grows upon*," there is a probability that it may be a variety of this species. It is nine inches long, branched, flattened, dense and incompressible, attached to a specimen of *Fusus islandicus*, and of a dirty light brown colour. Only one side, which is slightly convex, has orifices; these, as in *Halichondria ficus*, are "very few, small and scattered:" the opposite side is flat, and has evidently rested on the ground; at least it is impossible to conceive that the *Fusus islandicus* could support so large and heavy a sponge in an erect position. It was brought up by the lines from deep water off the coast of Northumberland.

RETEPORA BEANIANA†, nobis.

Specific Character.—Coral white, cup-shaped when young, afterwards irregularly and deeply folded; adhering to foreign bodies by a very short stalk; with meshes and interstices similar to those of a perforated strainer. *Meshes* longitudinally oval, a little narrower than the interstices, and somewhat quincuncially arranged. *Inner surface* of the coral celliferous. *Cells* (polypidoms) tubular, and arranged in linear series, of which from four to six occupy the width of an interstice. *Cell-apertures* in quincunx order, which is only slightly broken by the meshes: *upper lip* with an intumescence having a medio-longitudinal fissure: *under lip* with a central tubular process having a round terminal opening: *sides*, each with a long slender hollow spine. *Front wall of the cells* transversely convex, and with one or two foramina of the same diameter as the tubular processes. *Outer surface* of the coral marked with irregularly flexuose and anastomosing lines running somewhat longitudinally. *Polyps* of a red colour.

Dr. Johnston and others have considered this coral to be identical with the Mediterranean *Retepora cellulosa*, but after an examination of the characters of each, I have been led to conclude that they are distinct species. In the Mediterranean coral the interstices of the celliferous surface are furnished with strong hook-shaped processes curving upwards—generally two on each side of a mesh, but nothing of the kind is seen in the British species; and the under lip of the cell-apertures is not provided like the latter with a tubular process. Further, *Retepora*

the North Sea for the trough separating the coasts of Northumberland and Durham from the Dogger and Great Fisher banks seldom exceeds eighty fathoms.

* Dr. Johnston's British Sponges, &c., p. 146.

† I feel much pleasure in naming this coral after Mr. Bean, who was the first to discover it in the British seas (vide London's Magazine of Natural History, vol. vii. pp. 638 and 639).

cellulosa has the meshes generally wider than the interstices; in *R. Beaniana* they are not so wide. These differences are not the result of age, as they prevail in old and young specimens of both species; probably there may be other differences which can only be detected by a powerful microscope. In other respects, the British coral seems to be closely related to the one living in the Mediterranean. My specimens of *Retepora Beaniana* are from deep water off the coast of Northumberland*.

From an examination of a specimen of the Shetland *Retepora* in the Newcastle museum, I have very little doubt that it is the same species as the one found on our coast.

HYPOTHYRIS PSITTACEA (genus, Phillips) = *Terebratula psittaceae*, auct.

Notwithstanding it having been stated that this shell has been found at various places on the British coasts, there seems to be still some doubt on the mind of many conchologists that it is really a native of our seas. My specimens, one of which is as large as any that I have seen from the Arctic seas, were brought up from a depth of thirty fathoms, twenty-five miles from the north coast of Northumberland; they were dead specimens, and hanging to the byssus of a *Modiola vulgaris*. Mr. Maclaren has found it on the Berwickshire coast attached to the lines of the Coldingham fishermen †. My reasons for placing this shell in the genus *Hypothyris* are given in the July Number of the 'Annals of Natural History.'

PECTEN STRIATUS, Müller = *Pecten Landsburghii*, Forbes.

My specimen measures $\frac{7}{8}$ ths and $\frac{1}{16}$ th by $\frac{6}{8}$ ths and $\frac{1}{16}$ th, and was dredged in thirty fathoms water, thirty-five miles east of the south part of the coast of Northumberland. I have every reason to believe that it is not only specifically new to our coasts, but that it has not hitherto been found on the east coast of Britain.

CRENELLA DECUSSATA = *Mytilus decussatus*, Montagu.

I have a single specimen of this shell from the deep water of our coasts; it was lying in a cavity of a small stone brought up by the fishing-lines. Fabricius says that the *Crenella (Mytilus) faba*

* This coral was dredged in about sixty fathoms water off our coasts by Mr. Richard Howse of Sunderland, who went on a dredging excursion the week after mine. At the same time he dredged at about the same depth a live specimen of *Fusus barvacensis*, Johnston, an inch long, two nidamental capsules of *Fusus norvegicus* (an account of which is given hereafter), a live specimen of *Solen pellucidus*, a few specimens of *Astarte damnoniæ*, *A. scotica*, *Spatangus purpureus*, *Ophiuræ*, Corallines, &c. As in my case (which is now the third), he also encountered a heavy gale, which prevented the dredge being put down more than five times.

† Proceedings of the Berwickshire Naturalists' Club, vol. i. p. 213.

of Müller, an allied species, "inhabits the rocks of the sea, fixing itself by a copper-coloured byssus."

CRENELLA NIGRA = *Modiola nigra**.

The specimens which I have got of this shell on our coasts are very different in colour from those found in the Frith of Forth: when $\frac{7}{8}$ ths of an inch long they are of a brownish green colour; when an inch and three-quarters they are chestnut-brown; another difference obtains in the striæ, which are much finer on the Northumberland specimens than on those from the Forth.

The generic name which has been given to the two last shells requires a few observations. After examining the characters of the species which served as the type of Capt. Brown's genus *Crenella*, and comparing them with those of the so-called *Modiola marmorata*, *M. nigra*, *M. sulcata*, &c., I have been led to the conclusion, that these shells cannot be generically separated from *Crenella decussata*.

As regards external form, though the difference is great between *Crenella decussata* and *C. nigra*, yet how are we to distinguish the former from *C. faba* and *C. (Modiola) glandula*, Totten, which run completely into the latter? and as to the crenulated hinge-plates of *C. decussata*, they are to be seen, though generally less developed, in all the species that have been quoted.

In separating these shells from *Modiola*, I have been influenced more by the example of others than by any opinion of my own. Considering them as a single group, they have at various times been differently named: it would appear from Swainson that Humphreys distinguished it by the name of *Lanistes*†; in the 'Synopsis of the British Museum' they appear to be named *Modiolarca*; Swainson calls them *Brachydontes*; and Beck designates them *Modiolaria*. Mr. J. E. Gray even goes so far as to make a distinct family for them under the name of *Crenellidæ*, which "differs from that of *Mytilidæ* (*Mytilus*, *Modiola*) in the mantle lobes being united together so as to leave only two posterior holes for the entrance and exit of the water, and a slit for the foot and beard‡." It is possible I am in error as to the species which Mr. Gray places in the genus *Modiolarca*; it may be mentioned however, that in *Crenella (Modiola) marmorata* and *C. (M.) nigra*, there are, as in *Modiola vulgaris*, a long slit and only one "posterior hole;" the latter for the egress current, and the former for both the ingress current and the foot: in *Crenella marmorata*, owing to the anterior adductor muscle being strap-shaped, and extending unusually backward, the slit actually occupies the pos-

* Vide Montagu's Supplement, pl. 26. fig. 4.

† This name does not occur in Humphreys's Catalogue.

‡ Synopsis of the British Museum.

terior half of the shell, which I suspect is the same in *C. faba*, as its anterior muscular impressions are, in proportion, equally as elongated as those of *C. marmorata*. Notwithstanding there being so little difference between the animal of *Crenella marmorata* and that of *Modiola vulgaris*, I am somewhat in favour of generically separating the two groups represented by these species, as they may be readily distinguished from each other by the shells of the one being for the most part externally striated and having generally crenulated hinge-plates, and those of the other being externally smooth and possessing plain hinge-margins. If the generic value of the former group be admitted, the law of priority requires us to adopt Capt. Brown's name *Crenella* for it, while that of *Modiola* must be restricted to the latter.

LEDA MINUTA = genus *Lembulus*, Leach = *Nucula*, auct.

This species is rather rare on our coasts, and is generally brought up from a depth of from twenty to forty fathoms: my largest specimen measures $\frac{5}{8}$ and $\frac{1}{16}$ by $\frac{3}{8}$ ths of an inch.

With the exception of Dr. Leach and Mr. J. E. Gray*, none of our British conchologists have thought it necessary to separate generically the rostrated *Nuculas* from the rounded ones, which is remarkable, considering the two kinds differ from each other in more respects than that of external form. The rounded *Nuculas* have an iridescent inside and an entire pallial line, whereas the rostrated ones are of a milky hue internally, and the pallial line has a more or less deep sinus: this difference in the pallial line indicates that the animal of the latter is furnished with siphons, as first pointed out by P. C. Möller†, and that the animal of the former is without them‡. Considering these differences, it cannot but be admitted that the genus *Leda*, which Schumacher long ago proposed for the rostrated *Nuculas*, ought to be adopted: *Lembulus* is Dr. Leach's name for the same group, but as it appears never to have been published, except by other parties and at a date subsequent to the publication of Schumacher's, it necessarily falls to the ground.

Besides *Nucula* and *Leda*, another genus has been proposed by

* Since writing the above, I have read with pleasure Professor E. Forbes' remarks on this genus. Nearly two years ago, I had a paper prepared on a new genus for the *Nuculas* with a pallial sinus, which would have been sent to the 'Annals' but for accidentally finding among some packing-paper of a German book parcel a copy of the first number of Dr. Menke's 'Zeitschrift für Malakozöologie,' which made me acquainted with the fact that I had been anticipated both by Schumacher's *Leda* and Möller's *Yoldia*.

† Index Molluscorum Grœnlandia.

‡ Mr. R. Garner groups *Nucula* with the shells which have "a mantle without separate orifices or tubes" (vide Transactions of the Zoological Society, vol. ii. p. 101); but *Nucula margaritacea* has a pedal, an ingress, and an egress orifice.

Möller under the name of *Yoldia* for those *Nuculas* which agree with the last in being furnished with siphons, but which are thin, gaping, and of an oval form. From *Yoldia* we pass with little difficulty into *Solenella*—a genus whose affinities appear never to have been properly understood: the principal difference between *Solenella* and *Yoldia* is in the situation of the cartilage, which in the former is external, while it is internal in the latter; but this difference does not constitute any serious objection to an intimate relationship existing between these genera, since the like difference occurs even in *closely related* species of the same genus; for example, *Lucina divaricata* has an external cartilage, while *L. undularia**, Wood, has one that is decidedly internal.

There can be little or no doubt that *Nucula* and *Leda* are closely related to each other; hence we have another case, besides the one founded on the relation of *Iridina* to *Anodonta*, as first pointed out by Deshayes, “considerably invalidating the established rule †” that would compel us to include in one great family, the *Inclusa* of Cuvier, all those shells with “the mantle open at the anterior extremity, or near the middle, for the passage of the foot and extending to the other end in the form of a double tube.” To carry out such a rule would be to group together the most heterogeneous forms, and to widely separate those intimately related to each other by affinity: the genera *Unio*, *Anodonta* and *Margaritana*, which have the mantle open from front to back, ought in such a case to be placed near the *Monomyarians*, while *Iridina* and *Columba* (*Leila*, Gray?), *Lea*, which have all the characters, at least the last genus, of the *Enfermés*, ought to be collocated with the *Solens*, *Myas* and *Panopæas*.

ASTARTE SCOTICA, Montagu.

This species is somewhat rare on our coasts, where it occurs in deep water. The principal character which distinguishes it from *Astarte damnoniæ* is the plainness of the margins: I have a specimen however with the basal margins plain, but whose posterior and anterior margins are crenulated. Generally the inside of the valves, as well as the animal, are light-coloured, but occasionally they are red; it is the same with *Astarte damnoniæ*.

* Mr. Searles V. Wood places this interesting shell in the genus *Loripes* (vide *Annals of Nat. Hist.* vol. vi. p. 247), but its resemblance to *Lucina divaricata* plainly shows, that if this were agreed to, we should break one of the most obvious links of affinity, and group together shells not so closely related. The change of position of the cartilage is, I am inclined to think, to be seen in other closely allied species of *Lucina*; if so, the genus *Loripes* would be far from a natural one.

† Animaux sans Vertèbres, 2nd ed. tome vi. p. 572, &c.

AXINUS FLEXUOSUS = genus *Cryptodon*, Turton = *Ptychina*,
Philippi = *Lucina*, auct.

This shell appears to be much rarer on the east than on the west coast of Britain. Professor Macgillivray has found it off Aberdeenshire, and Mr. Maclaren has procured it on the Berwickshire coast. I have only seen a single specimen belonging to Northumberland, and that came up on the lines after they had been down in thirty fathoms water, twenty-five miles east of the Fern Islands.

If this shell *must* be separated from the genus *Lucina*, it will have to be named *Axinus* instead of *Cryptodon*, as the former name was previously applied to an allied or congeneric fossil (*Axinus angulatus*) belonging to the London clay, Mr. J. Sowerby having published the genus so designated in December 1823 (the date of No. 55 'Mineral Conchology,' in which it first appeared), while that of *Cryptodon* was not published till the early part of the following year (vide the dates of the dedication and title-page of Turton's 'British Shells')*.

MYSIA UNDATA (Leach's genus) = *Venus undata*, Pennant.

I dredged a specimen of this shell in fifty fathoms, but it is also to be found in much shallower water, as it is occasionally taken on the lines that have been down in twenty and thirty fathoms. *Mysia undata* and *Diplodonta rotundata* have often been placed in the same genus: the sinus in the pallial line of the former, however, generically separates it from the latter, which is one of the *Lucinidæ*.

MYA TRUNCATA, Linnæus.

Variety *M. pelagica*, nob. This variety is from deep water off the coast of Northumberland: it resembles the ordinary form of *Mya truncata*, but is more truncated posteriorly, approximating in this respect to *Mya uddevallensis*; but instead of the truncation being oblique as in the latter, it is perpendicular as in the former. Further, *Mya pelagica* agrees with the normal form of *Mya truncata* in the curve of the pallial sinus, but differs from it in the position of the posterior adductor muscular impressions,

* Mr. J. Sowerby included in the genus *Axinus* a very different shell belonging to the magnesian limestone—the so-called *Axinus obscurus*, for which and some mountain limestone species I have formed the genus *Schizodus* (vide Sir Roderick Murchison's *Geology of Russia*, vol. ii. p. 308). Professor E. Forbes, in stating that this shell "was the type of the Sowerbian genus *Axinus*" (vide vol. i. *Memoirs of the Geological Survey*, p. 412), overlooks the express declaration of Sowerby himself, that the London clay species (*Axinus angulatus*) was to be considered the type of this genus: this shell is also the one first described.

which are situated close to the edge of the posterior end of the shell, as in *Mya uddevallensis*. Young specimens of this variety are likewise more truncated than those of the same age of the normal form. I have seen specimens brought up from a depth of thirty fathoms intermediate between *M. pelagica* and the latter.

PANOPÆA ARCTICA = *Glycimeris arctica*, Lam.

I have much pleasure in recording this interesting shell as an addition to our local fauna. Mr. Bean has procured it on the Yorkshire coast: my specimens are from both the Northumberland and the Durham coast, where they were brought up from deep water. My largest specimen measures $3\frac{1}{4}$ inches by $2\frac{1}{4}$. It is a somewhat variable shell on our coasts, but apparently not more so than it was in the Mediterranean during the pleiocene period.

RIMULA NOACHINA = genus *Cemoria*, Leach = *Sipho*, Brown = *Puncturella*, Lowe.

I dredged a live specimen of this shell in fifty fathoms water, sixty miles to the east of the north coast of Durham. The species (*Rimula Blainvilli* and *R. fragilis*) on which this genus was founded do not differ generically from our local one; I have therefore been induced to adopt the earlier name of DeFrance in preference to that of Leach.

TROCHUS MILLEGRANUS, Philippi.

Only a single specimen of this beautiful shell has fallen into my hands; it was brought up by the lines from deep water off the coast of Northumberland.

SCALARIA TREVELYANIANA.

This species is only rare on our coast: a single dead specimen came up in the dredge from a depth of fifty fathoms. My largest and best specimen is $\frac{7}{8}$ ths of an inch in length, and is of a brownish flesh-colour.

NATICA GRÆNLANDICA, Beck.

Mr. Bean was the first to extend the geographical range of this shell to Britain: he finds it on the Yorkshire coast. Besides procuring it from the boats that fish on our coasts, I have dredged it alive in fifty fathoms. The animal is of a milk-white colour, and resembles that of *Natica Alderi* in form, but *apparently* it is not furnished with tentacles; I had it alive for a few hours, during which time it was very active, but either through not wishing to gratify me, or not possessing them, it never showed any trace of these appendages.

FUSUS ANTIQUUS, Müller.

The coasts of Northumberland and Durham afford two

strongly-marked varieties of this well-known shell, apparently consequent on the depth at which they live: thus the variety found in from fifteen to twenty fathoms water is thick and elongated, and the one procured from the greatest depths is thin, short and tumid. On contrasting these two varieties, many would pronounce them to be distinct species; but they are completely blended by a form which lives at an intermediate depth—about forty fathoms. The shallow-water variety, as it may be called, resembles the specimens figured in Capt. T. Brown's 'British Conchology,' 2nd ed. pl. 6. f. 8; Pennant's 'British Zoology,' vol. iv. pl. 78; and Donovan's 'British Shells,' vol. ii. pl. 31. My largest specimen is $6\frac{3}{4}$ inches in length and $3\frac{1}{2}$ in width, and has nine whorls.

I do not know of any published figure that represents the deep-water variety; perhaps the best idea of its form will be conceived from the following measurement of a median size specimen, which is $5\frac{1}{4}$ inches long and $3\frac{1}{2}$ wide, and has eight whorls; to which I may add, as general in the variety, that the whorls are extremely ventricose, that the siphon or canal is strongly twisted, and that when old the outer lip is very much reflected.

The largest specimen I have got, and which is now in the cabinet of Mr. J. Alder, is 7 inches in length and 5 in breadth, and has nine whorls.

The only figure I can find to illustrate the intermediate form is in Müller's 'Zoologica Danica,' pl. 118. fig. 1. My largest specimen measures 7 inches by $3\frac{3}{4}$, and has eight whorls. I have specimens approximating closely to *Fusus carinatus*.

FUSUS NORVEGICUS = *Strombus norvegicus*, Chemnitz.

The only British locality hitherto published for this species is the Yorkshire coast. I have procured it both from the coast of Northumberland and of Durham, where it lives in deep water. Although figured in the great work of Chemnitz, it is surprising that so few conchologists, continental or British, were aware of the existence of this shell until Dr. Turton announced it as having been found by Mr. Bean of Scarborough; a reduced copy of Chemnitz's figure is given in Wood's 'Index Testaceologicus.'

Fusus norvegicus differs decidedly from *Fusus antiquus*, with which it has occasionally been confounded: the canal is shorter and wider; the apical or nucleate whorls are considerably larger, being as large as in some of the mammillated *Volutes*; and the inner lip is much more expanded, being spread over the ventral convexity of the body-whorl considerably beyond its median line; further, it is much smoother externally, is more highly polished internally, and has a shorter spire; nor has it the siphonal ridge of *Fusus antiquus*.

The colour varies according to age ; in young specimens the aperture is simply fawn-coloured, but in those fully grown it is tinted with bluish pink ; the outer surface is fawn-coloured. The epidermis is of a light brown colour, but owing to its thinness is seldom preserved except in patches. When old, the outer lip is considerably spread out, which gives the shell a striking resemblance to some *Volutes*, particularly *Voluta magnifica*.

Before the young shell is excluded from the nidamental capsule, which contains from two to three individuals, it is a most beautiful object, resembling in its amber-like appearance some of the *Succineas* ; the capsules are similar to those of *Fusus antiquus*, but they are larger and not like them piled on each other, but agglutinated separately by a marginal expansion to the inside of dead shells. My largest specimen of *Fusus norvegicus* is $4\frac{1}{2}$ inches in length and $2\frac{1}{4}$ in breadth, and has six whorls : a full-sized embryo specimen is half an inch long and a quarter broad.

Although I have had a specimen alive of this shell, I have not seen the animal in action : the sides of its foot are marked with dark purple blotches ; the mantle on the columellar side is very much thickened, which allows of its being extended over the ventral part of the body-whorl, as indicated by the wide expansion of the inner lip ; and the organ homologous with the so-called *muero* of the penis of *Buccinum undatum* is very much produced and strikingly resembles the spiral of a cork-screw ; following the spiral it measures one inch and $\frac{5}{8}$ ths in length. I have not yet seen the male organ of *Fusus antiquus* ; I am therefore unable to make any comparison between it and the corresponding part of *F. norvegicus*. The operculum is very small and somewhat ovate.

FUSUS TURTONI, Bean.

This species and the preceding one are undoubtedly the most beautiful of the large shells inhabiting the British seas. Considering this circumstance and their extreme rarity, it may be readily imagined that I feel some degree of pleasure in recording them as natives of our coasts.

Fusus Turtoni may be readily distinguished from *Fusus antiquus* and *F. norvegicus* by its more elongated spire, smaller aperture, thicker epidermis, and the more truncated form of its siphon. When young the colour of its aperture is reddish brown, which in full-grown specimens changes to a rich purple-brown, while the lip is of a pure glossy white. The epidermis is of a yellowish horn colour. The outer surface of the shell is light-coloured ; the whorls are marked with slightly elevated broadish spiral cords ; the apex is mammillated, but not so much as it is in *F. norvegicus* ; the outer lip in full-grown specimens is thickened and reflected, while the inner one is somewhat more expanded than

that of *F. antiquus*; and the operculum is large and pyriform. My largest specimen measures 5 inches in length and $2\frac{3}{8}$ ths in breadth, and has eight whorls. It is found at the same depth and in the same places as *Fusus norvegicus*.

I am strongly inclined to think that the Uddevalla fossil figured in Hisinger's 'Lethæa Succica' (tab. 37. 2nd Supplement) under the name of *Buccinum anglicanum*?, if not a variety of *Fusus Turtoni*, is a nearly allied species. If its spire were a little more elongated and the canal a trifle more produced, Hisinger's shell would closely resemble the latter: for a certainty it is not a *Buccinum*, as it wants the well-developed siphonal ridge of this genus. In the form of the lower part of the columella, the Uddevalla fossil offers a striking resemblance to *Fusus Turtoni*.

FUSUS ISLANDICUS, Martini.

There are two varieties of this shell on our coasts: one from shallow water and similar to the specimens represented in Capt. Brown's 'British Conchology,' 2nd edit. pl. 6. figs. 7 and 9, and Donovan's 'British Shells,' vol. ii. pl. 38, being thick, long and narrow; and the other, which is from deep water, is thinner, shorter, and more tumid. The spiral lines are stronger, and more apart from each other on the elongated than on the tumid variety, and the canal is generally more twisted on the latter. The tumid variety appears to be intermediate in many respects to the elongated form, and the *Fusus ventricosus* of Gray found on the banks of Newfoundland.

The shell represented in Brown's 'British Conchology,' 2nd ed. pl. 6. figs. 11 and 12, appears to belong to the tumid variety, but none of my specimens are so short in the canal. My largest specimen of the tumid variety is $3\frac{5}{8}$ inches in length and $1\frac{1}{2}$ in breadth, and has nine whorls.

FUSUS BERNICIENSIS, nobis*.

Specific Character.—Length rather more than twice the breadth (the largest specimen I have got, and which appears to be a full-grown one, is $3\frac{1}{8}$ inches long and $1\frac{1}{2}$ broad, and has eight whorls). *Spire* (measuring from the apex to the suture at its junction with the outer lip) nearly half the length of the shell. *Aperture*, including the canal, pyriform. *Siphon* evenly rounded, slightly twisted, and tapering towards its termination; its greatest breadth half that of the aperture, and its length five-thirds of its breadth: columellar side not much thicker than the opposite one. *Outer lip* rather thickened, somewhat reflected and slightly sulcated,—the sulcations corresponding to

* From Bernicia, the name of the kingdom founded by Ida, and embracing the present counties of Northumberland, Durham, &c.

the largest of the cords on the outside of the shell. *Inner lip* expanded over the ventral part of the body-whorl to nearly its median line. *Whorls* ventricose, with numerous prominent spirally arranged cords, a large one (the thirty-second of an inch in size on the body-whorl) alternating with a smaller one (half the size of the other), and separated from each other by an interspace or furrow equal in width to one of the latter; occasionally a thread-like line runs along the interspaces: the cords are crossed by slightly elevated lines of growth at the distance of one of the spiral furrows from each other, which gives the surface of the shell rather a decussated appearance. *Colour* white. *Epidermis* thin and horn-coloured. [Animal and operculum unknown.]

This shell is undoubtedly allied to a group of species represented by *F. islandicus*, but it differs from all those that have been described in some of its characters, such as the prominent spiral cords, the wide expansion of the inner lip, the form of the siphon, &c. In the spiral cords it bears a resemblance to *F. striatus*, Sow. (particularly the specimens figured in the 'Mineral Conchology,' pl. 22, if they were furnished with a smaller cord running between those that are represented): in the expansion of the inner lip it offers an approximation to *F. norvegicus*, and consequently differs from *F. islandicus*, which has the same part as little expanded as in *F. antiquus*; and in the form of the siphon (that is, its tapering off towards the extremity) it resembles *F. antiquus*, and thereby differs from *F. islandicus*, the siphon of which preserves the same width throughout its entire length. *Fusus islandicus*, though without a siphonal ridge, so prominent in *Fusus antiquus*, evidently displays a tendency to form one; but in *F. berniciensis*, owing to the evenly rounded form of the siphon and the thinness of its columellar side, there is no appearance of such a tendency. To the *Fusus Sabinii* of Gray* our shell appears to bear some resemblance; but it is much to be regretted, that the smallness of the specimen examined by Mr. Gray will not allow of a rigid comparison between it and those of *F. berniciensis*, the most perfect of which is four times as large. From the description of *Fusus Sabinii*, I am led to believe that *F. berniciensis* is more strongly ribbed, that its aperture is of a different form, that its siphon is longer, and that its lines of growth are not so prominent.

The deep water on the Northumberland coast has yielded me two specimens of this interesting species. Should I ever be so fortunate as to procure a live one, I will endeavour to complete its specific character.

* Vide Supplement to Capt. Parry's Arctic Voyage in the years 1819-20, p. cxxl-cxxli.

BUCCINUM UNDATUM, Linn.

The coasts of Northumberland and Durham yield four distinctly marked varieties of this shell, three of which it is my intention to consider separately, and under the following names: *Buccinum magnum*, *B. littoralis* and *B. pelagica**.

Variety *Buccinum magnum*.—The nearest representation I can find of this variety are the figures in the 'Encyclopédie Méthodique,' (pl. 399. fig. 1 *a*—1 *b*). My largest specimen measures $4\frac{3}{4}$ inches in length and $2\frac{2}{5}$ ths in breadth, and has nine whorls. The spirally corded character of this variety is very striking (though none of my specimens are quite so strongly corded as the figure just referred to): on the body-whorl the cords are generally an eighth of an inch apart, but in some specimens they are separated from each other to the extent of a quarter of an inch: the intermediate furrows are occupied with from three to six threads.

The canal is short and wide, and both sides are of equal length, and its terminal margin is strongly reflected. The waves are rounded; and it is rare to see them becoming obsolete even on the body-whorl of the largest specimens. The outside of the shell is generally yellowish or reddish white, and the inside is of a milk-white colour. The epidermis is thick, clothly, and of a dirty brown. This variety lives at depths varying from fifteen to forty fathoms, and from its epidermis being generally dirty, there

* There are now so many names given to shells generally considered to be merely varieties of *Buccinum undatum*, that I was in hopes of using some of them for those described in the text. I find however that this is impracticable: for example, *Buccinum striatum* is generally considered to represent the thin or deep-water form, but the shell which Pennant describes under this name (vide *British Zoology*, vol. iv. pl. 74. fig. 91), as remarked long ago by Dr. Turton (vide *British Fauna*, p. 171), is "without the undulate ribs;" in short, it does not possess the specific characteristic of *Buccinum undatum*—the waves; it is simply longitudinally plicated. As this is not general (exceptions occasionally occur) to any of the varieties on our coasts, I am consequently prevented using the name "*striatum*." With reference to the name *Buccinum Donovanii*, Gray, this has been given to a shell which I am disposed to think is merely an elongated form of my *B. pelagica*, and which occurs only rarely on our coasts: in other localities it may be a more general form; if so, the name may therefore be advantageously retained for it. As to the name *Buccinum anglicanum*, I confess my inability to decide as to what shell it was originally given. On the whole then it seems preferable to make use of new names when there are so many difficulties in the way of adopting the old ones. I am not certain that my names can be applied to varieties found in other localities: the *Buccinum undatum* sold in London is different from the varieties that I have described: I have a beautiful specimen from some part of Ireland very different from any on our coasts; it has the waves, but it is decidedly without the spiral cords, being simply striated. I have seen specimens from other localities that cannot be identified with our varieties.

can be little doubt that it lives on a muddy bottom : the largest and thickest specimens are from the shallowest water. The Newcastle museum possesses an aberrant form of this variety without the least trace of waves, and resembling the *Buccinum carinatum* of Turton.

Variety *Buccinum pelagica*.—In speaking of the last variety it was stated, that the thickest specimens were from the shallowest water, that is from fifteen to twenty-five fathoms, and, as implied, that the thinner kinds were from a greater depth, say from twenty-five to forty fathoms : the same variation is observable in the variety under consideration ; the thickest specimens are to be found in from forty to fifty-five fathoms, while the thinnest live in from fifty-five to eighty fathoms. In short, there is an unbroken gradation of character from the very thick shell found in fifteen fathoms water to the excessively thin one which has its habitat in eighty fathoms : but how different is their appearance when they are contrasted ! take for example a full-grown specimen of each variety from the extremes of depth.

<i>Buccinum magnum</i> var.	<i>Buccinum pelagica</i> var.
4½ inches long, 2¾ inches broad.	4¾ inches long, 2 inches broad.
Nine whorls.	Ten whorls.
⅞ths of an inch in thickness.	⅞th of an inch in thickness.
Spiral cords and threads prominent and persistent.	Spiral cords and threads small and becoming obsolete on the large whorls.
Epidermis thick and clothly.	Epidermis thin and ciliated.
Waves large and on all the whorls.	Waves small and only on the first six whorls.
Both sides of the siphon of the same length.	The columellar side of the siphon much shorter than the opposite one.
Weight 3½ ounces.	Weight ½ an ounce.

I have not yet procured any specimens of *Buccinum pelagica* without the waves and simply threaded, as appears to be the case with the *Buccinum ciliatum* of Fabricius, but I have some closely approximating to this species in these respects : in a few of my specimens the waves lose their peculiarity, and become simple longitudinal plications, not in the least undated. If *Buccinum ciliatum* occurred on our coast, I should be strongly inclined to regard it as another variety.

Buccinum pelagica has a strong tendency to become elongated : I have specimens closely resembling the shell figured by Donovan as the *Buccinum glaciale** (the same shell has been named *Buccinum Donovanii* by Mr. J. E. Gray). Its colour is extremely variable, being externally white, variously shaded with brown, yellowish, and often marked with two or more reddish brown or purple bands : owing to its thinness, the outside colours are often

* British Shells, pl. cliv.

displayed on the inside of the aperture; occasionally there is so little calcareous matter in the shell that it is almost horny.

Variety *Buccinum littoralis* is so called in consequence of only being found close in shore on pebbly bottoms and rocks laid bare at low tide. From being on such rough and exposed grounds, it is extremely liable to become broken and abraded, which will account for so few being found in a perfect state: at one locality near Sunderland, it is however often found in beautiful condition; here the specimens are always white externally with a yellow aperture: in various other localities on the coast of Northumberland, it is brown externally, and of a variously shaded purple colour within. This variety, at least as it occurs near Sunderland, has the waves rounded, regular, and not very prominent: the cords and threads are closer to each other than in *B. magnum*, from which it differs in being a shorter and a smaller shell, in having a shorter spire, the whorls standing less boldly out from the sutures, and the terminal margin of the canal less reflected. The epidermis is thinnish and of a light brown colour. My largest specimen measures $2\frac{7}{8}$ inches in length and $1\frac{1}{8}$ in breadth, and has eight whorls; it is very seldom that specimens are found exceeding this size.

Besides the foregoing, another strongly marked variety occurs on our coasts; but as it is probable it will be described elsewhere by others who have paid more attention to it than I have, I shall merely state, that one of the principal differences between it and *Buccinum magnum*, as first pointed out to me by Mr. A. Hancock, is in the general absence of an epidermis; the fishermen say that it lives on hard or rocky ground. The figure in Pennant's 'British Zoology,' pl. 73, appears to represent the same shell. I have seen two aberrant forms of this variety; one is thin, waveless and subulate, somewhat resembling the *Buccinum acuminatum* of Broderip; and the other is of the normal form, but without any waves.

To the conchologist who is interested in the modifications to which a species is subject from a variation of habitat, depth, or from other causes, nothing can be more pleasing than to see the various permanent forms of *Buccinum undatum* belonging to our coasts; but how much more interesting would a collection be of all the varieties that are known to live under every shade of climatal influence! Deshayes says that *Buccinum undatum* is found ranging "from the North Cape to Senegal, modifying itself according to the temperature as it advances*:" it is well known to occur on the shores of North America; and the palæontologist is certain that it lived as far back as the meiocene period. I have

* Charlesworth's Magazine of Natural History, vol. i. p. 10.

endeavoured to describe some of the modifications of this species as they occur at the present point of time on the coasts of Northumberland and Durham; let us hope that others will be induced to describe more of its modifications as prevailing on these coasts and elsewhere during either the present or an earlier period. If this should be done to a proper extent, it is not too much to anticipate that sufficient materials will be accumulated to necessitate the publication of an illustrated monograph of the species *Buccinum undatum*.

XXVII.—*The Birds of Calcutta, collected and described by*
CARL J. SUNDEVALL*.

[Continued from p. 176.]

17. *Phenicornis flammea*, Boie.—*Musc. flammea*, Forster, *Lath. Temm. Pl. Col.* 263.

Alarum tectricibus quibusdam pennisque posticis apice flavo-limbatis. Rostri carina paullo obtusa.

♀ (Calcutta 22 Febr.) cinerea, uropygio concolori; subtus pallide flava, gula albida; linea per oculos fusca, supercilia albida. Ala nigra, vitta flava e fascia remigum 5, et sequentium. Tectrices inferiores et margo carpi flava. Cauda prioris. Rostrum et pedes nigri. Long. $7\frac{1}{2}$ poll., ala 87 millim., tarsus 14, rostrum e fronte 12; altitudo 5, latitudo 7. Iris fuscescens. (Alia similima, reetricibus utrinque 5 apice flavis, e Calcutta, Mus. Stockh.)

♂ junior (e Calcutta, Mus. Stockh.), ut ♀ sed subtus sordide coloratus, collo antico parum flavo tincto. Uropygium leviter flavotinctum. Flavedo caudæ splendidior. Ala 88 mill.

♂ adultus e Java, superne cum gula et jugulo niger, cæruleo nitens; subtus uropygio, vitta alarum caudaque lateribus splendide luteo-fulvis. Rectrices utrinque 5 extrorsum luteæ. Mensuræ ut ♀.

I saw only the described hen-bird without being able to examine its actions, &c. closer. It had insects in the stomach, and in its cellular texture under the belly-skin lay two pretty large intestinal worms (*Ascarides*). The ovary was quite visible, but small.

17 b. *Phenicura miniata*? Temm. Pl. Col. 156.

♂ Junior? e Calcutta, Mus. Stockh. Cinereus, subtus cinerascenti-roseus, gula alba. Ala nigra, fascia remigum, apicibus tectricum majorum pennarumque posticarum, et parte exteriori rectricum 5 lateralium læte rubris (roseis). Uropygium rubro (nec flavescenti) tinctum. Ala 87 millim., tarsus 14. Simillimus mari juniori prioris, colore flavescente in rubrum mutato †.

* Translated from the 'Physiographiska Sällskapets Tidskrift' by R. Bertram, with Notes by H. E. Strickland, M.A.

† This bird is the *Pericrocotus roseus* of Vieill., and not the *miniatus* of Temminck.—H. E. S.